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AUTHOR Hansen, Georgene
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ABSTRACT

A study examined the relative merits of individual and cooperative methods of vocabulary instruction in the seventh grade. It was hypothesized that socialization would act as a motivating force among these adolescents, and that those involved in paired instruction would show increased vocabulary retention. Students in both control (individual) and experimental (paired) groups were assigned the same exercises. Results show that, while there was a substantial gain in vocabulary for both groups, the experimental group made a greater gain. Among the factors for the paired groups' superior performance may have been their enthusiasm for the program, the challenge inherent in working with a partner, and the use of oral language and discussion during instruction. A review of related literature dealing with peer tutoring conclusively points to the increased academic gains made by all (both tutor and tutee) involved, as well as more positive self-image, increased interest in school, and greater self-confidence. Teachers benefit as well by having an increased opportunity to individualize instruction. Many teacher's guides to peer tutoring include suggestions for activities and guidelines for setting up a peer tutoring program, training tutors, and evaluating the program. (LLZ)

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COOPERATIVE VS. INDIVIDUAL LEARNING EFFECTS ON VOCABULARY RETENTION

BY

GEORGENE HANSEN

Submitted in Partial Fulfillment of the Requirements of the Masters of Arts Degree in Reading Specialization.

Kean College of New Jersey
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Abstract

This study was conducted to determine if there was a significant difference in vocabulary achievement between children who worked in cooperative learning pairs and those children who worked individually.

For the purpose of the study, one seventh grade class of eight boys and six girls acted as a control; another class, also comprised of eight boys and six girls functioned as the experimental sample.

The results of the study showed that the experimental sample made significant gains in vocabulary development; vocabulary learning was enhanced when pupils worked with partners.

Acknowledgement

This work is dedicated to my best friend, the husband who supported, encouraged, consoled, and congratulated me - as the occasion required.

I thank him for all the times he helped me with research, carried my books, and kept me company on the long trips to Kean.

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Cooperative learning, the pairing of one student with another to accomplish mastery of a skill, has long been an integral part of the educational schema. Land (1984) tells us that the ancient Greeks and Romans used student tutors. In America, in remote or sparsely settled areas of our country, in one-room schoolhouses, logistics demanded that students help each other learn; there were simply too many levels and needs for one teacher to adequately instruct each individual. Maria Montessori incorporated peer learning as an essential component of her method. Gartner (1971) describes the monitorial system used by Joseph Lancaster who did not have money to hire the teachers he needed for the school he opened for poor children. Lacking staff, he used the children themselves as teachers with positive results. More recently, largely as a result of the success of programs initiated to increase skills of inner-city school children, attention has again begun to focus on peer learning situations.

Thelan (1967) points out that there is available to teachers a successful and practical classroom management technique which is seldom implemented. He suggests that children learning by helping one another is a promising alternative to the traditional method which

fosters learning through competition with others. He adds:

> It also makes the acquisition of knowledge and skills valuable, not in the service of competition for grades but as the means for personally significant interaction with others.

Certainly children learn from adults, but traditionally they learn much from other children too. Big brothers or sisters show younger siblings "the ropes"; nursery school classmates teach each other games or skills; adolescents demonstrate the latest dance steps to one another; all these are shared learnings.

This interaction with others, in the spirit of cooperation rather than competition, can provide another path to the goal of knowledge acquisition. With the lessening of tension, anxiety is dispelled and satisfaction increases while the students support and reinforce learning patterns. This emotional component may be an important factor that contributes to learning. Gurnee (1968) found that greater learning took place because the condition of collaboration produced greater "pleasantness". Delanian's (1980) study reaffirmed this conclusion. She noted that adolescent learning patterns develop through the socialization process. Students use each other as reference groups; peer pressure may therefore influence learning.

Another aspect relevant to the cooperative learning method is the pedagogically sound principle that children should be actively involved in the educational process. As Gartner (1971) points out, Dewey (1897) believed that because the child was forced to assume a passive attitude in school, much time and strength in school was wasted. Elliott (1977) commented on a similar theme, suggesting that the child needs to become "an active participant in his own learning".

Increased interaction between students provides more opportunity for oral communication. A classroom setting which enables and encourages children to become partners in learning provides the opportunity for language growth while at the same time increases the personal relevance of the material to be mastered. Vassallo (1973) observes that children can frequently get points across to each other that the teacher hasn't been able to make clear.

HYPOTHESIS

To provide additional evidence about the topic of cooperative learning, a study was established to determine the relative effects of the cooperative and individual methods on vocabulary instruction of seventh graders. It

was hypothesized that individual needs of the seventh grade students would be more likely to be met due to increased communication and discussion. Gains in vocabulary growth would more likely be achieved by individuals who complete practice exercises when teamed with a peer. Since the socialization process would act as a motivating force, cooperative completion of vocabulary exercises would increase retention in the learning partner pairs.

DEFINITIONS AND LIMITATIONS

The utilization of specific terms needs clarification for replication purposes. For the purposes of the study peers were identified as students of the same age or grade level, cooperative learning as working with a partner to accomplish mastery of a skill, and self-concept as an individual's awareness of who or what he is.

The experimental and control groups were a result of the alphabetical division of students into two homeroom sections. These sections were limited to the seventh grade level, and thus, the results might not be applicable beyond this sample.

PROCEDURES

The subjects, seventh grade students from a middle class socio-economic background, had previously been divided alphabetically into two homeroom sections. For this study, the beginning alphabet section, A-M, which contained eight boys and six girls, acted as a control, while the latter alphabet section, M-Z, comprised of eight boys and six girls, functioned as the experimental sample.

Prior to instruction, the examiner administered the Diagnostic Test, Level B, of Vocabulary Workshop as a pretest to both the experimental and control samples.

Vocabulary instruction was provided during one class period each week; care was taken to ensure equal amounts of time were allotted to each section. The method of instruction was identical for both samples. The examiner displayed, one at a time, flashcards on which were written the ten new vocabulary words for the week. The words were used in context as they were presented, and pronunciations and meanings were discussed. The flashcards remained on display in a prominent place in the classroom for a week.

Working on an individual basis, the control sample was required to complete written assignments in the vocabulary book Vocabulary Workshop. Each unit of

practice exercises consisted of the following: Completing the Sentence, in which the student must choose the word that best fits the sentence; Antonyms, in which the student must select the word most nearly opposite the definition given; Synonyms, in which the student must choose the word most nearly the same as the given expression; and Choosing the Right Word, in which the student must decide which of two words most satisfactorily completes a sentence. The experimental sample was expected to complete the same assignments, but they could work with another student. No attempt was made to control the selection of a partner; the only stipulation was that the partners must work on vocabulary and not just socialize. While both groups were working, the examiner circulated around the room, was available for help as needed, responded to questions, and kept students on task.

Weekly tests, on a recognition level, were given for each list of ten words. Students could use the flash-cards, which remained on display at the front of the room, to fill in the answers as definitions and context examples were given by the examiner. Periodic review tests were also given, using the Vocabulary Workshop, Level B, supplementary testing program. At the end of the study, the Diagnostic Test, Level B was readministered as a

posttest.

No attempt was made by the examiner to compare or correlate any of the data from the weekly tests. Since the goal of the study was to focus on long term retention of vocabulary words, only data gathered from pre and post test assessment were compared.

RESULTS

After fourteen weeks of instruction, all students were given the posttest and calculations were made to determine vocabulary gain.

TABLE I

MEAN, STANDARD DEVIATION, AND t TEST OF THE PRETEST SCORES OF THE CONTROL AND EXPERIMENTAL SAMPLES

	Mean	Standard Deviation	t Test
experimental	26.79	8.48	.30
control	27.79	8.38	

As shown in Table I, there was no significant difference between the mean scores of the pretest of the experimental sample's mean of 26.79 as compared with the control sample's mean of 27.79 using a one-tailed test of

significance. It can be concluded from these data that at the outset of the study the two samples were similar in vocabulary.

TABLE II

MEAN, STANDARD DEVIATION, AND t TEST OF THE POSTTEST SCORES OF THE CONTROL AND EXPERIMENTAL SAMPLES

	Mean	Standard Deviation	t Test
experimental	35.43	6.18	1.21
control	31.79	8.60	

Table II indicates that, using a one-tailed test of significance, the t of 1.21 did not approach significance at the .05 level when comparing the difference between the experimental sample's mean score of 35.43 and the control sample's mean score of 31.79. When Table II is compared with Table I, it can be noted that during the time of the study there was a substantial gain in vocabulary for both samples, but that the experimental sample made a greater gain.

TABLE III

MEAN GAIN, STANDARD DEVIATION, AND t TEST OF THE EXPERIMENTAL AND CONTROL SAMPLE

	Mean Gain	Standard Deviation	t Test
experimental	8.64	4.97	2.33
control	4.0	5.56	

Table III shows that the experimental sample's mean gain of 8.64 was significantly higher than the control sample's mean gain of 4.0, as shown by the t of 2.33 which, for one-tailed tests was significant below the .05 level, but the difference was not great enough to be significant at the .01 level. For this a t of 2.479 would have had to be achieved.

DISCUSSION

Very early in the course of this study, it became apparent to the researcher that the dynamics operating in each sample differed greatly. Students in the experimental sample began, on a regular basis, to request vocabulary activities on days other than the scheduled one each week.

Members of the control sample, on the other hand, never expressed any interest in the subject, nor did they ever request additional time for vocabulary work.

During the third week of the study, one student from the experimental sample proposed that each member of the class predict, by writing his name on the board, if he felt that he would achieve a perfect score on the weekly vocabulary test. After the examiner agreed, the predictions were made, and the test was given. Once the customary procedure of switching papers to correct the test had been accomplished, one student decided that he deserved a star on the board; others concurred, so all who had fulfilled their predictions drew stars on the board beside their names. One final procedure was initiated when a student suggested the recording of stars on a chart. Never at any time did the examiner remind the group of the prediction chart; never did this group ever fail to remember to make predictions and record the results.

The examiner informed the control sample about the predictions and chart that the experimental group had instigated. The control sample duplicated the activity for that day's test. They were also never reminded about the chart; they never remembered it, nor did they use it again.

It was obvious that the members of the experimental sample completed their work more quickly, more accurately,

and much more enthusiastically. Vocabulary day, with this group, came to be something all looked forward to.

CONCLUSIONS

The hypothesis that there would be a significant difference between the experimental and control samples in terms of vocabulary development as a result of the treatment was supported in that the results indicated that the experimental sample was better - significantly better. Therefore we conclude that this kind of treatment in an instructional study would be an important one. The Question is why.

It seems as though there is a challenge when two people work together; one is potentially challenged to do better than the other person, or at least that is a part of the activity that goes on when working with pupil peers. There is not a threatening kind of challenge because the student is paired with someone he'd ordinarily work with.

Another dynamic which may contribute to retention may be the increased use of oral language and discussion that was necessary in order to complete assigned workbook exercises.

On the basis of the results of this study, it can be concluded that vocabulary learning was enhanced when pupils worked in pairs.

COOPERATIVE LEARNING, PEER TUTORING, AND ACHIEVEMENT: RELATED LITERATURE

Since this study was established to examine the effects of cooperative learning on vocabulary achievement, an examination of related literature was undertaken.

Several authors have completed a review of published research on tutoring. Devin-Sheehan, Feldman, and Allen, (1976) looked at how guidelines for the cross-age tutoring program developed by Lippett and Lippett (1968) were implemented by the Ontario-Montclair School District in California. Their conclusion was that, although it was a carefully developed and evaluated approach, the results were ambiguous and inconsistent. However, both tutors and tutees did achieve academic gains.

Gartner, Kohler, and Riessman (1971) reported on the structured tutoring methods that were successfully used in the Pocoima School District, Los Angeles, California, as initiated in 1967/68. From a small beginning, in which fifth and sixth-graders tutored first-graders, and first-graders tutored each other, this program grew into a school-wide project involving community residents, parents, and teachers. Data indicated that the program was a factor that contributed to major improvements in the reading achievement of minority students. Melaragno (1977), who implemented this system, pointed out that "when a tutorial

system is used for a number of years, two changes occur. First, the system itself improves as teachers and tutors become more familiar with it and are better able to carry out responsibilities. Second, the needs of learners who have received tutorial assistance differ from those of pupils for whom the system was developed." Pupils who have been successfully tutored in lower grades will likely have different instructional needs in higher grades than students of previous years. This indicates that the scope of the system should be expanded or adjusted in order to adapt to changing needs.

Cloward (1967) evaluated a program that featured high school students in a slum area who were employed as tutors for low-achieving public elementary school pupils. The tenth and eleventh graders, used as tutors for fourth and fifth graders reading below grade level, were given preservice training and received in-service support throughout the sessions. Experimental pupils, randomly assigned, were provided with tutorial assistance one or two afternoons a week, while control groups received no services. Both groups were tested prior to the start of the program and again five months later. Experimental subjects, also randomly chosen, served as tutors; the control group did not. Both groups were tested at the

beginning of the program and again seven months later. The findings showed that the major impact of the tutorial program was on the tutors themselves; the experimental subjects showed twice as much improvement in reading achievement as the controls. Their students also produced significant gains in reading skill. Hassett (1974) wrote seven years later about the continuing effectiveness of this program, the High School Helper Program, which was funded by the New York State Urban Education Project, and extended to students in fifty-eight high schools in New York City. Eligible students, those who are two or more years below grade level in reading or mathematics, received tutoring in any high school subject; the emphasis was on improvement of reading and study skills. Instruction was provided by peer tutors. As a result of the support this program offered, many student athletes retained their eligibility. In addition, students from homes where Spanish was the primary language received assistance from bilingual students. Overall benefits have been evident, as shown by the higher scores achieved on standardized tests.

Another program that was designed to aid disadvantaged youth was the Youth Tutoring Youth program of the National Commission on Resources for Youth. Devin-Sheehan's (1976)

analysis of this program supported the conclusion that both tutors and tutees gained from their participation. Tutors, who developed a more positive self-image and improved language skills, also showed more interest in school. The tutees were found to have increased reading interest and skills, more self-confidence, and less difficulty with classroom interaction.

Slavin (1980) summarized the results of twenty-eight field projects in which cooperative learning methods were used in elementary or secondary classrooms. The implications appeared to justify several conclusions. Academic achievement was, in most cases, improved by cooperative learning techniques which used a structured and focused schedule of instruction, required individual accountability, and provided a well-defined reward system in order to affect low level learning outcomes. For higher level cognitive learning, less structure and more autonomy appeared to lead to success. One major factor that was consistently a component of cooperative learning was the positive effect on race relations.

Vassallo (1973) discussed this aspect of peer tutoring's influence on relationships between races when she wrote about the Tutoring Program of the Dallas Independent School District. She quoted Jim Daniel, the

driving force and organizer of the program. "Cultural, social, economic barriers fall. Cliques break up. Kids really get to know one another."

Stainback, Stainback, and Lichtward's (1975) review of research evidence of student-to-student tutoring found that many studies had limitations. They questioned the reliability of some of the data-gathering instruments and the criteria used to select experimental and control groups. They also felt that the Hawthorne Effect was not always controlled. Devin-Sheehan (1976) agreed that "much tutoring research can be criticized for inadequate statistical control and lack of rigorous research design." They noted areas that need further attention and called for an end to "fragmented, inconclusive, and noncumulative research."

Elliott (1977), after a year of studying the operation and outcome of student tutoring programs in Los Angeles concluded that "student tutoring is highly effective in achieving the basic goals of public education, namely the cognitive, affective, and social development of the child."

Pierce (1982,1983), as a result of review of research on the benefits of collaborative learning, identified three major areas of benefits. She found that

the tutee received increased individual attention, learned more efficiently, had a role model to emulate, and gained in self-esteem. The tutor improved abilities in academic areas; acting as a tutor deepened understanding of subject matter. In addition, self-esteem of the tutor was enhanced, social skills were developed, and feelings of increased personal competence led to greater tolerance of others. The teacher benefited also. Tutoring made possible a greater degree of individualized instruction, encouraged professional partnerships to cooperatively plan strategies, expanded the resources within the classroom, elicited positive attitudes, and was cost-effective.

Land (1984) reviewed the literature, focusing on the effect of peer tutoring on student achievement and self-concept in the modern classroom. In his summary, he concluded that peer tutoring is a worthwhile and valuable technique that can motivate while increasing the self-concept and academic achievement of both tutor and tutee.

Several studies focused on a comparison of cooperative learning groups versus competitive classes. Haines and McKeachie (1967) used college psychology students as subjects in their experiment. By alternating the cooperative with the competitive techniques of teaching, each class acted as its own control. They found that

students in a competive situation "became more anxious, displayed a greater incidence of self-oriented needs, and found themselves losing self-assurance. Further, they were less able to perform effectively in recitation, and they became dissatisfied with the discussion procedure. When discussion was structured copperatively, students felt less tense, displayed more task-oriented behavior, worked more effectively, and enjoyed the discussion." They claimed that their research provides a basis to question the practice of using competition to motivate students.

Along the same lines, two studies conducted by Fraser, Beaman, Diener, and Kelem (1977) assessed the effects of a peer monitoring procedure on college psychology students during consecutive quarters. The control group, in the first quarter, were taught using traditional methods. The experimental group members, in the following quarter, were assigned learning partners based on grade point averages. Students with high grade point averages were roughly matched with students with low grade point averages; they were not informed about how or why the match-ups were made. Results of their first study showed that the grade distributions for the two classes were significantly different; the number of A's and B's increased substantially in the peer monitoring class while the number performing at

a C level decreased. Furthermore, no student in the experimental group received either a D or an F. Even though the results of this first study were strong, the authors felt that there were certain flaws in the design so they implemented another study. In the new program, each student was assigned 0,1,2, or 3 learning partners. His final grade was based on the average score of the individual performances of group members or on his own score if he had no partner. This study attempted to replicate the results of the first study, and, in addition, assess the effects of different peer monitoring groups on academic performance. Again, the peer monitored groups outperformed the control group. One additional result, which was not measured by testing, was the positive attitude and spirit of friendship that developed in class and in discussion sessions.

Blaney, Stephan, Rosenfield, Aronson, and Sikes (1977) conducted a field study to assess the effectiveness of interdependent learning groups, as opposed to teacher taught competitive classes. Participating were ten interdependent groups of fifth graders in which each member was both teacher and pupil, while three classes were used as a control. Experimental group teachers were given training to change their roles from "teacher of information to facilitator of group processes." Each student had the responsibility of

learning one part of the material to be mastered, and would in turn teach what he had learned to the group. Thus, each group member depended on every other group member to master all of the material. Results were found to be positive. Children showed increases in liking for groupmates, liking for school, and self-esteem. Gurnee (1968) attempted to investigate how rate of learning is affected by competition or collaboration. Random pairs of college students were used as subjects to learn a bolthead maze. One half of the pairs were in competition; the other half collaborated. Later the arrangement was reversed for a different maze. He found that learning rate was significantly more rapid when the pairs collaborated, and that individuals of inferior learning ability benefited much more from this collaboration. It appeared that the subjects in collaboration received more reinforcements as well as the cognitive advantage of gaining information from a partner.

Ehly and Bratton (1981) conducted a peer tutorial study in which sixth graders instructed partners in spelling. They focused on interpersonal processes during tutoring and on learning outcomes for tutees. Tutors were children who scored in the upper half of the class on a 500-word spelling test. They were randomly assigned to tutees who scored in the lower half on the same test; there was no control group.

Prior to tutoring, each student completed a peer-liking scale; after the last session, they rated their partners on perceived competency and affect. In addition, they completed a rank-ordering of the liking for partner scale. Findings were inconclusive; tutor-tutee characteristics did not predict learning outcomes.

Jacobs (1978), as a result of her study, found evidence that assigning students to partners in disregard to personal preference had a detrimental effect on performance; the more they disliked working with a partner (as indicated by a questionnaire), the lower their performance.

Milford (1976) allowed the subjects in her study to choose their own partners. Not only did the experimental group of students, which included peer teachers, gain in reading achievement, they also made significant gains over the control group in writing mechanics and usage.

Because Borak's (1977) initial study showed that the tutees wanted a chance to tutor, she undertook a second study in which the subjects switched roles. College students, randomly divided into two groups, were randomly assigned to a same-age, same-ability dyad (grades 2-5). One group of college students gave direct instruction to the pair and individual instruction to each. The second group of college

students provided some direct instruction, then taught the children tutoring behaviors and provided the children an opportunity to tutor each other. The results were statistically significant. Children involved in Reciprocal Peer Tutoring made greater gains in reading than the group which received direct instruction. A third study was undertaken in order to find if it were possible to predict a child's potential success as a tutor. The examples suggested that the increased opportunity to use language and to interact with structured and organized communication is a key to potential growth.

Rosen and Powell (1977) and Rosen, Powell, and Schubot (1977) were concerned about the relative status of tutors and tutees. In their study, same-sex tutor-tutee pairs were told their scores on a pretest, randomly assigned a role, and then asked to fill out a questionnaire about their expectations of future performance and satisfaction. Following the first tutoring session both an achievement test and a second-impressions questionnaire were given. Following the second tutoring session, a posttest and another questionnaire were given. The results of the experiment showed that changes in assigned role status and in role equity made a difference in performance and satisfaction. A related study, with junior high pupils, produced results that paralleled the first. The conclusion was that "turn-

taking while tutoring optimizes joint gains."

Other studies also came to the same conclusion. Bierman and Furman (1981) analyzed the effects of role and assignment rationale on general attitudes. They found that tutors preferred their roles and perceived them as more important than tutees did. Their findings suggest that "the positive effects of peer tutoring on the tutor may, to some extent, be counterbalanced by less desirable effects on the tutee." They recommended that children switch roles periodically. Johnson (1978) found evidence that status and the novelty of switching roles improved motivation and performance for some students. Cooper (1982) found, in two studies of peer interactions, that "children who were spontaneously selected as teachers were those who were capable of providing clear and informative feedback." She suggests that "teachers can enhance peer learning by allowing children to develop areas of individual expert power or expertise and helping them demonstrate this competence to others." Dunson (1977) concluded that "the greater achievement of peer teachers over peer students or individuals using self-instruction is due to the fact that more cognitive processing of the information is necessary in order to teach the material.

Additional information that was garnered with reference to peer tutoring took the form of suggestions or guidelines from authors who have successfully implemented peer tutoring programs. Morrissey (1975) wrote a guide to help a teacher set up a peer tutoring system, discussed the benefits, suggested materials, and offered management techniques. Moore and Harris (1976) also provided a model and suggestions. Larsen and Ehly (1976) presented a rationale for a peer tutoring program. They offer step-by-step guidelines for initiating a program, selecting and pairing the students, training, supervision, scheduling, and feedback to those involved. Hiebert (1980) described how to use peer-directed activities. She stressed the need for comprehensive planning as well as careful monitoring of the activity. Asselin and Vasa (1981) identified several factors that are important to a successful peer tutoring program. They provided many guidelines, described the responsibilities of the parties involved, included training activities, and suggested evaluation instruments. Bondi (1982) described activities that have been successful in her classroom. Harris and Aldridge (1983) declare that peer tutoring is the most efficient way to individualize a classroom. They provide a model with three components:

The Peer Trio Technique, Peer Mediated Games, and Teacher Monitoring System.

The results of many different research studies that deal with peer tutoring, peer collaboration, or cross-age tutoring conclusively point to the increased academic gains that were made by all parties involved. In addition, many of the studies discussed other benefits that accrued. Gains included: more positive self-image, development of language skills, increased interest in school, and greater self-confidence. The opportunity for interaction and socialization was noted to have had a positive effect on race relations and in many cases lessened anxiety about learning. Teachers benefited also; the expansion of available resources allowed for an increased amount of individualization, thereby facilitating learning. Lessening of competition seemed to have a positive effect on attitudes of teacher and student alike while at the same time helping to provide a suitable environment for learning.

Several studies point out some caveats. It appears to be more beneficial to have students switch roles; to alternate the role of tutor and tutee, to share the status involved. In addition, the learning experience has been shown to be more effective when the student is paired with a

partner with whom he or she is compatible. Furthermore, planning and organization by the teacher is essential.

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APPENDICES

APPENDIX A

Raw Score of Pre and Post Tests for Control Sample.

Subject	Raw Score	
	Pre	Post
1	41	41
2	39	46
3	38	42
4	36	37
5	36	36
6	29	25
7	26	31
8	26	34
9	23	27
10	22	33
11	21	33
12	19	12
13	17	22
14	16	26

APPENDIX B

Raw Score of Pre and Post Tests for Experimental Sample.

Subject	Raw Score	
	Pre	Post
1	40	42
2	40	40
3	36	44
4	32	42
5	30	39
6	29	34
7	27	41
8	27	34
9	25	30
10	24	33
11	23	34
12	16	26
13	15	35
14	11	22

APPENDIX C

Gain in raw score from Pre and Post Tests for Control Sample.

Subject	Gain
1	--
2	+7
3	+4
4	+1
5	--
6	-4
7	+5
8	+8
9	+4
10	+11
11	+12
12	-7
13	+5
14	+10

APPENDIX D

Gain in raw score from Pre and Post Tests for Experimental Sample.

Subject	Gain
1	+2
2	--
3	+8
4	+10
5	+9
6	+5
7	+14
8	+7
9	+5
10	+9
11	+11
12	+10
13	+20
14	+11